

UK Patent Application (19) GB (11) 2 349 618 (13) A

(43) Date of A Publication 08.11.2000

(21) Application No 9910431.7

(22) Date of Filing 06.05.1999

(71) Applicant(s)
Delphi Technologies, Inc.
(Incorporated in USA - Delaware)
P O Box 5052, Troy, Michigan 48007,
United States of America

(72) Inventor(s)
Bernd Uwe Zimmerbeutel
Gert Nilson
Detlev Guthke

(74) Agent and/or Address for Service
M J Denton
Delphi Automotive Systems, 31 Carlton Hill,
LONDON, NW8 0JX, United Kingdom

(51) INT CL⁷
B60R 21/16

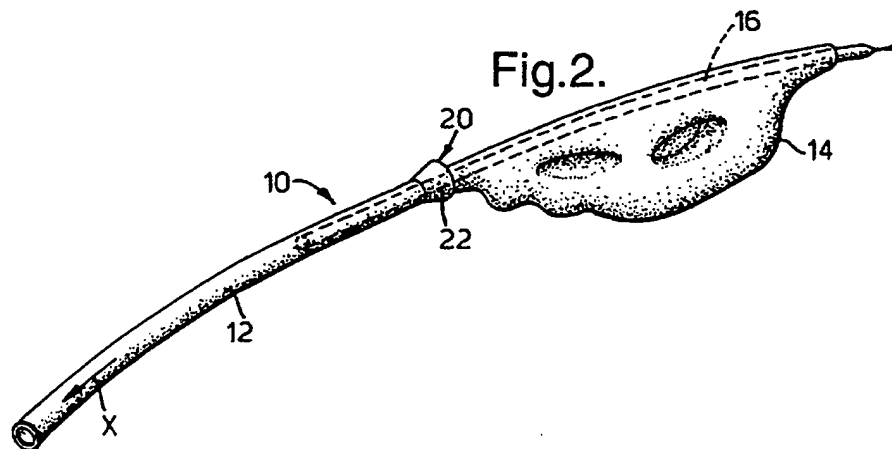
(52) UK CL (Edition R)
B7B BSBCC

(56) Documents Cited
US 5810390 A

(58) Field of Search
UK CL (Edition Q) B7B BSBCC
INT CL⁶ B60R 21/16 21/20
Online WPI

(54) Abstract Title
Method of assembling an airbag module

(57) A method of assembling an airbag module 10, comprising the steps of securing a longitudinally extending structural member 16, inside an airbag 14, having an extended profile, to form a sub-assembly, drawing the sub-assembly through an open end 20 of a longitudinally extending tubular housing 12, until the airbag is surrounded by the housing, along at least part of its length. A further aspect of the invention provides an airbag module, assembled using said method, and further incorporating a longitudinally extending tear line (18, Fig 4) in the tubular housing. The method of assembly may also include the step of folding the airbag in a predetermined pattern, by means of a specially shaped funnel member 22, at the open end of the tubular housing. The structural member 16 may be a gas delivery tube, while the tubular housing 12 may be formed from plastics material, fabric material or shrink foil.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

GB 2 349 618 A

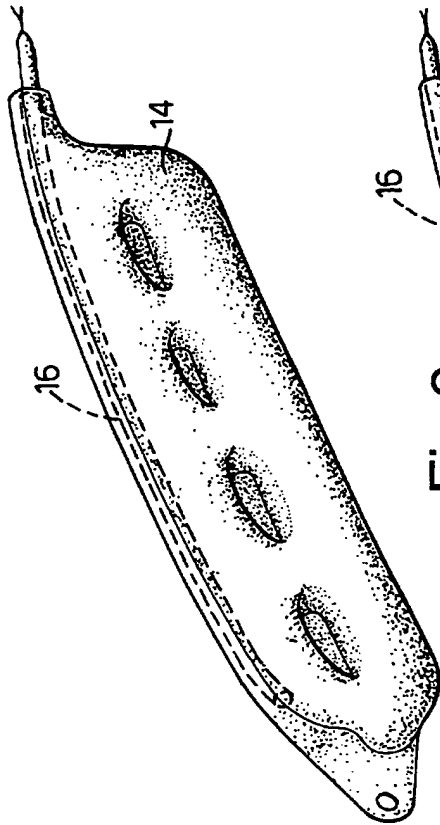


Fig. 1.

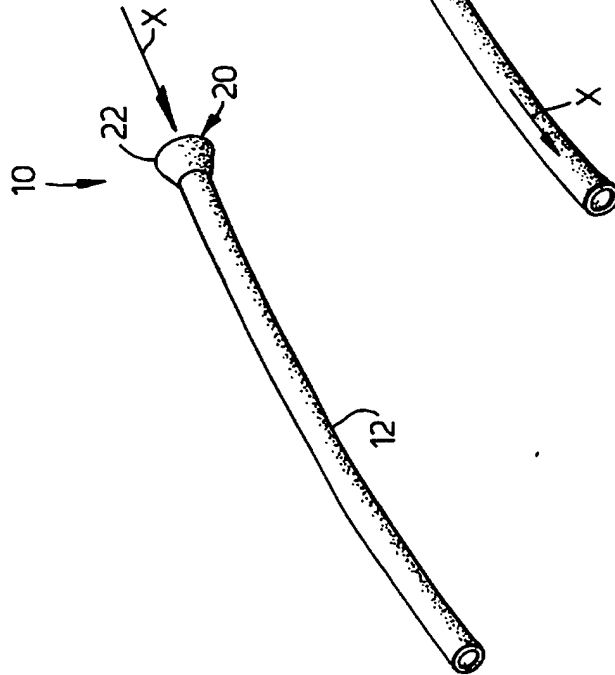


Fig. 2.

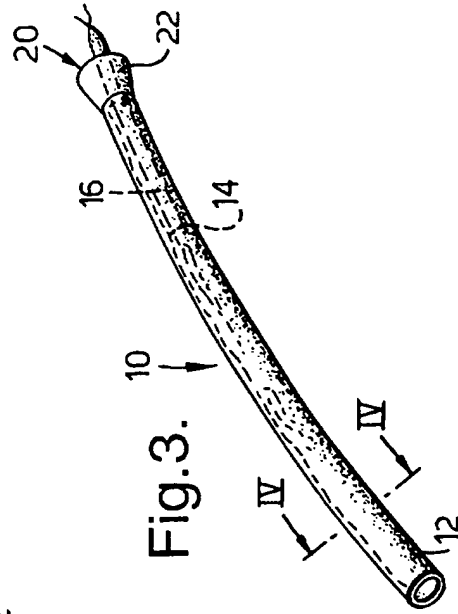


Fig. 3.

Fig.4.

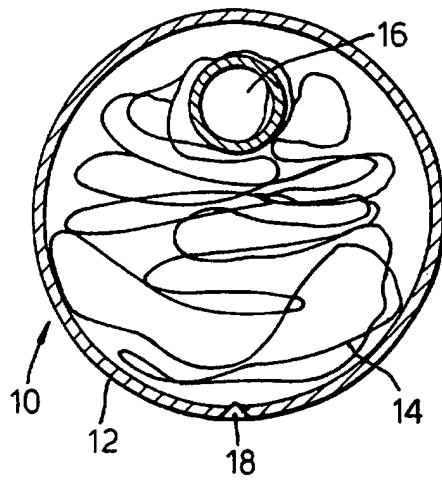


Fig.5.

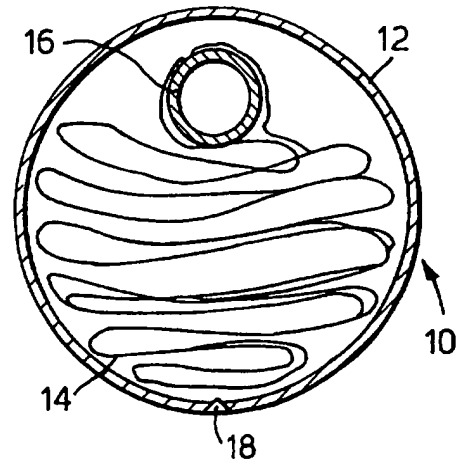


Fig.6.

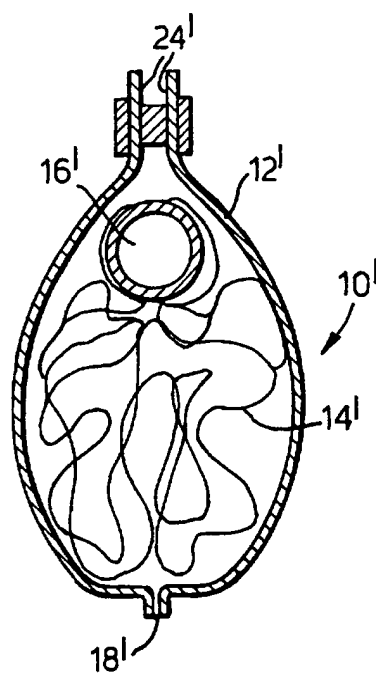
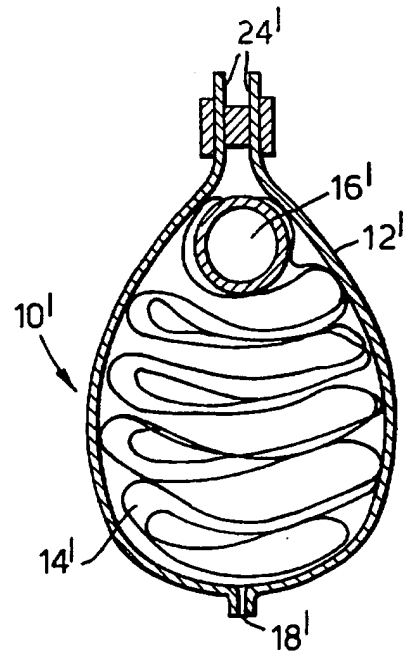


Fig.7.



A METHOD OF ASSEMBLING AN AIRBAG MODULE

Technical Field

5 The present invention relates to a method of assembling an
airbag module in which the airbag has an extended or longitudinally extending
shape, and an airbag module assembled by such a method.

Background of the Invention

10 Extended or longitudinally extending airbags are known, and
are sometimes referred to as side curtains or side airbags. Such airbags can be
mounted in the roof or door of a motor vehicle adjacent the side of an
occupant seat, in general to provide protection for an occupant during a side
impact on the vehicle. Assembly of such known airbag modules is both time-
15 consuming and costly.

Summary of the Invention

It is an object of the present invention to overcome the above
mentioned disadvantages.

20 A method of assembling an airbag module in accordance with
the present invention comprises the steps of securing a longitudinally
extending structural member inside an airbag having an extended profile to
form a sub-assembly of the structural member and the airbag; drawing the
sub-assembly through an open end of a longitudinally extending tubular
25 housing; and continuing with the drawing step until the airbag is surrounded
by the housing along at least part of the length of the airbag.

The present invention also includes an airbag module
comprising an airbag having an extended profile; a longitudinally extending
structural member secured in positioned inside the airbag; and a longitudinally
30 extending tubular housing having a longitudinally extending tear-line and

surrounding the sub-assembly of structural member and airbag along at least part of the length of the airbag.

The present invention provides a method of assembly with is easier and cheaper than previously known arrangements for airbag modules
5 having an airbag with an extended profile; and also provides an airbag module which is minimal in size.

Brief Description of the Drawings

The present invention will now be described, by way of
10 example, with reference to the accompanying drawings, in which:-

Figure 1 is a side view of a first step in the assembly of an airbag module in accordance with the present invention using a method in accordance with the present invention;

Figure 2 is a side view of a second step in the assembly process
15 of Figure 1;

Figure 3 is a side view of a third step in the assembly process of Figure 1;

Figure 4 is a cross-sectional view on the line IV-IV of Figure 3;
and

20 Figures 5 to 7 are cross-sectional views similar to that of Figure 4 of alternative embodiments of airbag module in accordance with the present invention.

Description of the Preferred Embodiment

25 Referring to Figures 1 to 4, the airbag module 10 in accordance with the present invention comprises a longitudinally extending tubular housing 12; an airbag or cushion 14 having an extended profile; and a longitudinally extending structural member 16. The structural member 16 is positioned inside the airbag 14. The structural member 16 may be a gas lance
30 or gas diffuser tube which is connected to an inflator (not shown) for the flow of inflation gas from the inflator into the airbag 14 during deployment of the

airbag. In the latter case, the inflator may be secured to the structural member 16 at the position where the structural member enters the airbag 14. The tubular housing 12 has a longitudinally extending weakened section or tear-line 18 which splits during deployment of the airbag 14; and is open at one
 5 end 20.

The method of assembling the airbag module 10 in accordance with the present invention comprises securing the structural member 16 inside the airbag 14 by any suitable method to form a sub-assembly; and then pushing the sub-assembly in the longitudinal direction X into the tubular
 10 housing 12 through the open end 20 thereof, as shown in Figure 1. The step of pushing the sub-assembly in the longitudinal direction X is continued (Figure 2) until the airbag 14 is at least partially (and preferably fully) positioned inside the tubular housing 12 (Figure 3). The structural member 16 provides support for the airbag 14 during installation of the airbag into the
 15 tubular housing 12. With this process, as shown in Figure 4, the airbag 14 has an irregular fold pattern when positioned inside the tubular housing 12. In an alternative arrangement, the airbag 14 may be folded into a predetermined regular pattern (as shown in Figure 5) either prior to pushing the sub-assembly of structural member 16 and airbag into the tubular housing 12, or whilst the
 20 sub-assembly is being pushed into position.

A funnel-shaped member 22 or similar device may be positioned at the open end 20 of the tubular housing 12 to assist in the insertion of the sub-assembly of structural member 16 and airbag 14. The funnel-shaped member may be specially shaped to fold the airbag into the
 25 predetermined regular pattern during the insertion process. After assembly, the airbag 14 may be secured to the tubular housing 12 in any suitable manner.

The tubular housing 12 may be moulded or extruded from plastics material. Alternatively, the tubular housing may be formed from
 30 fabric, shrink foil, or any other suitable material, which can be sewn or formed as a tubular housing. As shown in the alternative embodiments of

airbag module 10' in Figures 6 and 7, where the airbag 14' has an irregular fold and a regular fold respectively, the tubular housing 12' is formed from fabric material which is joined along longitudinally extending edges 24' on the opposite side to the tear-line 18'. The tubular housing may contain separate
5 shape maintaining elements (not shown). In a further alternative arrangement, the tubular housing 12 may be defined by a number of substantially axially aligned tubular members which either totally surround the sub-assembly of airbag 14 and structural member 16, or partially surround the sub-assembly along at least part of the length of the airbag.

10 In the above described process, the structural member 16 is used for pushing the airbag 14 into the tubular housing 12. It will be appreciated that by using an alternative design of structural member, the structural member could be used for pulling the airbag into the tubular housing.

15 The present invention provides an airbag module 10, 10' which is easy and cheap to assemble, and which has a minimal size.

Claims

1. A method of assembling an airbag module comprising the steps of securing a longitudinally extending structural member inside an airbag having an extended profile to form a sub-assembly of the structural member and the airbag; drawing the sub-assembly through an open end of a
5 longitudinally extending tubular housing; and continuing with the drawing step until the airbag is surrounded by the housing along at least part of the length of the airbag.
2. A method as claimed in Claim 1, further comprising the step of folding the airbag into a predetermined pattern either prior to, or during, the drawing step.
3. A method as claimed in Claim 1 or Claim 2, wherein the drawing step comprises pushing the sub-assembly of the structural member and the airbag into the tubular housing through the opening end thereof.
4. A method as claimed in any one of Claims 1 to 3, further comprising placing a funnel shaped member at the open end of the tubular housing prior to the drawing step.
5. A method as claimed in Claim 2, further comprising placing a funnel shaped member at the open end of the tubular housing prior to the drawing step, wherein the funnel shaped member is shaped to fold the airbag into the predetermined pattern during the drawing step.
6. An airbag module comprising an airbag having an extended profile; a longitudinally extending structural member secured in positioned inside the airbag; and a longitudinally extending tubular housing having a longitudinally extending tear-line and surrounding the sub-assembly of
5 structural member and airbag along at least part of the length of the airbag.

7. An airbag module as claimed in Claim 6, wherein the structural member is a gas tube for delivering inflation gas to the airbag during deployment of the airbag.

8. An airbag module as claimed in Claim 6 or Claim 7, wherein the airbag has an irregular fold pattern.

9. An airbag module as claimed in any one of Claims 6 to 8, wherein the airbag is secured to the tubular housing.

10. An airbag module as claimed in any one of Claims 6 to 9, wherein the tubular housing has been moulded or extruded from plastics material.

11. An airbag module as claimed in any one of Claims 6 to 9, wherein the tubular housing is formed from fabric material or shrink foil.

12. An airbag module as claimed in any one of Claims 6 to 11, wherein the tubular housing is defined by a number of tubular members which are substantially axially aligned.

13. A method of assembling an airbag module substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

14. An airbag module substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.



Application No: GB 9910431.7
Claims searched: 1-14

Examiner: Richard Collins
Date of search: 18 October 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): B7B BSBCC.

Int Cl (Ed.6): B60R 21/16, 21/20.

Other: Online WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	US 5810390 A (ENDERS) figures 1 to 3.	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.